

TRANSACTIONS
— OF THE —
AMERICAN
FISHERIES
SOCIETY



SEPTEMBER, 1916

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at The Aquarium, New York, N. Y.

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The American Fisheries Society

Organized 1870—Incorporated 1910

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TRANSACTIONS
of the
American Fisheries Society

"To promote the cause of fish culture; to gather and diffuse information bearing upon its practical success, and upon all matters relating to the fisheries; to unite and encourage all interests of fish culture and the fisheries; and to treat all questions of a scientific and economic character regarding fish."

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SEPTEMBER, 1916

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CERTIFICATE OF INCORPORATION OF THE AMERICAN FISHERIES SOCIETY

We, the undersigned, persons of full age and citizenship of the United States, and a majority being citizens of the District of Columbia, pursuant to and in conformity with sections 599 to 603, inclusive, of the Code of Law for the District of Columbia, enacted March 3, 1901, as amended by the Acts approved January 31 and June 30, 1902, hereby associate ourselves together as a society or body corporate and certify in writing:

1. That the name of the Society is the AMERICAN FISHERIES SOCIETY.

2. That the term for which it is organized is nine hundred and ninety-nine years.

3. That its particular business and objects are to promote the cause of fish culture; to gather and diffuse information bearing upon its practical success, and upon all matters relating to the fisheries; to unite and encourage all interests of fish culture and the fisheries; and to treat all questions of a scientific and economic character regarding fish with power:

a. To acquire, hold and convey real estate and other property, and to establish general and special funds.

b. To hold meetings.

c. To publish and distribute documents.

d. To conduct lectures.

e. To conduct, endow, or assist investigation in any department of fishery and fish-culture science.

f. To acquire and maintain a library.

g. And, in general, to transact any business pertinent to a learned society.

4. That the affairs, funds and property of the corporation shall be in general charge of a council, consisting of the officers and the executive committee, the number of whose members for the first year shall be seventeen, all of whom shall be chosen from among the members of the Society.

Witness our hands and seals this 16th day of December, 1910.

SEYMOUR BOWER (Seal)

THEODORE GILL (Seal)

WILLIAM E. MEEHAN (Seal)

THEODORE S. PALMER (Seal)

BERTRAND H. ROBERTS (Seal)

HUGH M. SMITH (Seal)

RICHARD SYLVESTER (Seal)

Recorded April 15, 1911.

AMERICAN FISHERIES SOCIETY

Organized 1870

The first meeting of the Society occurred December 20, 1870. The organization then effected continued until February, 1872, when the second meeting was held. Since that time there has been a meeting each year, as shown below. The respective presidents were elected at the meeting, at the place, and for the period shown opposite their names, but they presided at the subsequent meeting.

PRESIDENTS, TERMS OF SERVICE, AND PLACES OF MEETING.

1. William Clift.....	1870-1872	New York, N. Y.
2. William Clift.....	1872-1873	Albany, N. Y.
3. William Clift.....	1873-1874	New York, N. Y.
4. Robert B. Roosevelt.....	1874-1875	New York, N. Y.
5. Robert B. Roosevelt.....	1875-1876	New York, N. Y.
6. Robert B. Roosevelt.....	1876-1877*	New York, N. Y.
7. Robert B. Roosevelt.....	1877-1878	New York, N. Y.
8. Robert B. Roosevelt.....	1878-1879	New York, N. Y.
9. Robert B. Roosevelt.....	1879-1880	New York, N. Y.
10. Robert B. Roosevelt.....	1880-1881	New York, N. Y.
11. Robert B. Roosevelt.....	1881-1882	New York, N. Y.
12. George Shepard Page.....	1882-1883	New York, N. Y.
13. James Benkard.....	1883-1884	New York, N. Y.
14. Theodore Lyman.....	1884-1885	Washington, D. C.
15. Marshall McDonald.....	1885-1886	Washington, D. C.
16. W. M. Hudson.....	1886-1887	Chicago, Ill.
17. William L. May.....	1887-1888	Washington, D. C.
18. John H. Bissell.....	1888-1889	Detroit, Mich.
19. Eugene G. Blackford.....	1889-1890	Philadelphia, Pa.
20. Eugene G. Blackford.....	1890-1891	Put-in Bay, Ohio
21. James A. Henshall.....	1891-1892	Washington, D. C.
22. Herschel Whitaker.....	1892-1893	New York, N. Y.
23. Henry C. Ford.....	1893-1894	Chicago, Ill.
24. William L. May.....	1894-1895	Philadelphia, Pa.
25. L. D. Huntington.....	1895-1896	New York, N. Y.
26. Herschel Whitaker.....	1896-1897	New York, N. Y.
27. William L. May.....	1897-1898	Detroit, Mich.
28. George F. Peabody.....	1898-1899	Omaha, Neb.
29. John W. Titcomb.....	1899-1900	Niagara Falls, N. Y.
30. F. B. Dickerson.....	1900-1901	Woods Hole, Mass.
31. E. E. Bryant.....	1901-1902	Milwaukee, Wis.
32. George M. Bowers.....	1902-1903	Put-in Bay, Ohio.
33. Frank N. Clark.....	1903-1904	Woods Hole, Mass.
34. Henry T. Root.....	1904-1905	Atlantic City, N. J.
35. C. D. Joslyn.....	1905-1906	White Sulphur Spgs., W. Va.
36. E. A. Birge.....	1906-1907	Grand Rapids, Mich.
37. Hugh M. Smith.....	1907-1908	Erie, Pa.
38. Tarleton H. Bean.....	1908-1909	Washington, D. C.
39. Seymour Bower.....	1909-1910	Toledo, Ohio.
40. William E. Meehan.....	1910-1911	New York, N. Y.
41. S. F. Fullerton.....	1911-1912	St. Louis, Mo.
42. Charles H. Townsend.....	1912-1913	Denver, Colo.
43. Henry B. Ward.....	1913-1914	Boston, Mass.
44. Daniel B. Fearing.....	1914-1915	Washington, D. C.
45. Jacob Reighard.....	1914-1915	San Francisco, Calif.

*A special meeting was held at the Centennial Grounds, Philadelphia, Pa., October 6 and 7, 1876.

The American Fisheries Society

EDITORIAL

REPORT OF THE TREASURER.

As stated in a note at the foot of page 83 (Transactions, Vol. XLV, No. 2, March, 1916), of the proceedings of the San Francisco meeting, the report of the Treasurer for the year 1914-15 was missing. It has since been found and is herewith presented.—R. C. O.

To the American Fisheries Society:

I hereby submit my Annual Report as Treasurer from September 30, 1914, to September 1, 1915:

RECEIPTS.

1914

Sale of Reports	\$ 50.50	
Postage Deposit Refund	12.52	
Life Membership Fees	50.00	
Yearly Dues	675.10	
		\$788.12

EXPENDITURES.

1914

Sept. 30—Balance due Treasurer	\$257.84
Oct. 3—Dr. H. M. Smith, postage, etc.	7.12
Oct. 7—Clark & Fritts, printing	16.75
Oct. 10—W. F. Roberts Co., printing	20.85
Oct. 18—C. J. Butler, P. M., stamped envelopes...	10.68
Nov. 5—R. J. Holmes, stenographer	115.75
Dec. 6—W. F. Roberts Co., printing	14.00
Dec. 7—Clark & Fritts, printing	6.00

1915

Feb. 12—Clark & Fritts, publishing	207.38	
March 2—Consolidated Engraving Co.	3.00	
April 26—Clark & Fritts, publishing	159.22	
July 26—C. J. Butler, P. M., stamped envelopes...	21.36	
Aug. 10—Clark & Fritts, publishing	119.55	
Aug. 18—J. C. Hall Co., receipt books	6.75	
Aug. 20—Raymond C. Osburn, Secretary	71.62	
Aug. 20—Clerical work	3.00	
	<hr/>	
	\$1,040.87	
Balance due Treasurer		\$252.75
		<hr/>
		\$1,040.87

Respectfully submitted,

C. W. WILLARD, *Treasurer.*

Westerly, R. I., September 1, 1915.

DISTRIBUTION OF ANNUAL MEETINGS

The coming annual meeting in New Orleans calls to mind the fact that never before in the history of the Society has a meeting been held in the South. Washington, D. C., White Sulphur Springs, W. Va., and St. Louis, Mo., can scarcely be considered as being more than on the border line.

A glance at the geographical distribution of the annual meetings of the past forty-five years reveals the fact that twenty-nine of them have been held in the Middle Atlantic States, ten in the Middle Western States,

six in Washington, D. C., three in New England (all in Mass.) and three in the west.

How are these irregularities to be accounted for? The first thirteen meetings after the organization of the Society were held in New York City, with one exception, Albany. This was probably because of the central position of New York with regard to the early membership. Since that time five meetings have been held in New York State, and only once in the last sixteen years. The six meetings held in Washington are not a disproportionate number when one considers the interest and activity of the members of the Bureau of Fisheries in the work of the Society. Aside from the above, only four States have had as many as three annual meetings, Massachusetts, Pennsylvania, Ohio and Michigan. Other States are as follows: Illinois, 2; Nebraska, Wisconsin, New Jersey, West Virginia, Missouri, Colorado and California, one each. Since 1900 there have been only two repetitions, indicating a desire on the part of the Society for a fair distribution of the meetings.

Undoubtedly a number of factors have entered into the choice of meeting places in recent years. The most important of these seems to be the distribution of members, most of whom are still in the New England, Middle Atlantic and North Middle States. Interest in fish culture has also been an important factor. For example, two of the Massachusetts meetings were held at Woods Hole and two of the Ohio meetings at Put-in-Bay. Great "convention cities," which have much to offer the visitor in the way of sight-seeing, have also influenced the distribution of the meetings, as witness New York, Washington, Boston, Philadelphia, Chicago and San Francisco.

Now, why have no meetings until the present one been held in the South? Two reasons which come to my mind at once seem sufficient to explain this apparent neglect. In the first place, the membership in the southern states has always been comparatively slight, possibly because, owing to smaller population and natural advantages, the necessity for artificial culture of fish has not been so

pressing as in some other regions of our country, and therefore there has been less interest in this work and in the Society. If so, this is a condition that will bring its own cure in a few years,—the necessity is already keenly felt in some parts of the South, in fact. But of far greater weight is the fact that the meetings have always been held in the latter part of the summer, at the time when the fisheries men are as a rule more free to attend than at any other time, and then the southern states are supposed to be hot. The climate may be quite bearable, to be sure, as the writer can testify, but the northern man who has not summered in the South is firmly inclined to the belief that he would melt completely away if compelled to spend a few days in summer below Mason's and Dixon's Line.

New Orleans has broken the ice (a mere figure of speech, of course, as none ever occurs there outside of the refrigerator and the drinkables), and undoubtedly the meetings will be held in the South with increasing frequency in coming years, especially with the growth of membership in that section.—R. C. O.

LIFE OF INLAND WATERS

The science of limnology or hydrobiology, the study of the fresh waters and their inhabitants, has recently been enriched to the scientist and laid open to the beginning student and casual reader by the publication of a book bearing the above title, prepared by Prof. Jas. G. Needham and Mr. J. T. Lloyd of Cornell University, and issued by the Comstock Publishing Co. of Ithaca, N. Y. The long experience and fruitful work of the senior author are alone sufficient recommendation for the quality of the book, and it will be found an extremely instructive work, of value to all those interested in fisheries and the problems of the fresh waters.

While space will not permit a thorough digest of the four hundred and thirty-eight pages of well-selected and interesting reading matter, illustrated by two hundred

and forty-four cuts, it may not be amiss to cite the topics discussed, which are in brief:

The nature of the aquatic environment,—properties and uses of water, water and land;

Types of aquatic environment,—lakes and ponds, streams, marshes, swamps and bogs;

Aquatic organisms,—plants, animals;

Adjustment to conditions of aquatic life,—individual adjustment, mutual adjustment;

Aquatic societies,—limnetic societies, littoral societies;

Inland water culture,—aboriginal water culture, water crops, water culture and civic improvement;

Bibliography,—more important papers dealing with life in the water;

Index.

While, as might be expected from the previous work of the authors, the emphasis is placed on ecology or the relation of aquatic organisms to their environment, there is also much valuable material on the general biology and life histories of aquatic forms, and the economic side is not neglected.

The reviewer does not hesitate to recommend the book as well worth the perusal of anyone interested in aquatic life.

R. C. O.

LIST OF MEMBERS, 1914--1915

Showing Year of Election to Membership

Honorary Members

The President of the United States, WOODROW WILSON.
The Governors of the several states.
Alabama, CHARLES HENDERSON.
Arizona, GEORGE W. P. HUNT.
Arkansas, GEORGE W. HAYS.
California, HIRAM W. JOHNSON.
Colorado, GEORGE A. CARLSON.
Connecticut, MARCUS A. HOLCOMB.
Delaware, CHARLES R. MILLER.
Florida, PARK M. TRAMMELL.
Georgia, NAT. E. HARRIS.
Idaho, MOSES ALEXANDER.
Illinois, EDWARD F. DUNNE.
Indiana, SAMUEL M. RALSTON.
Iowa, GEORGE W. CLARKE.
Kansas, ARTHUR CAPPER.
Kentucky, A. O. STANLEY.
Louisiana, LUTHER E. HALL.
Maine, OAKLEY C. CURTIS.
Maryland, EMERSON C. HARRINGTON.
Massachusetts, SAMUEL W. MCCALL.
Michigan, WOODBRIDGE N. FERRIS.
Minnesota, W. S. HAMMOND.
Mississippi, THEODORE G. BILBO.
Missouri, ELLIOT W. MAJOR.
Montana, SAMUEL V. STEWART.
Nebraska, JOHN H. MOREHEAD.
Nevada, EMMET D. BOYLE.
New Hampshire, ROLLAND H. SPAULDING.
New Jersey, JAMES F. FIELDER.
New Mexico, WILLIAM C. McDONALD.
New York, CHARLES S. WHITMAN.
North Carolina, LOCKE CRAIG.
North Dakota, L. B. HANNA.
Ohio, FRANK B. WILLIS.
Oklahoma, R. L. WILLIAMS.
Oregon, JAMES WITHEYCOMBE.
Pennsylvania, M. G. BRUMBAUGH.
Rhode Island, R. LIVINGSTON BEECKMAN.
South Carolina, RICHARD I. MANNING.
South Dakota, FRANK M. BYRNE.
Tennessee, THOMAS C. RYE.
Texas, JAMES E. FERGUSON.
Utah, WILLIAM SPRY.
Vermont, CHARLES W. GATES.
Virginia, H. C. STUART.
Washington, ERNEST LISTER.
West Virginia, HENRY D. HATFIELD.
Wisconsin, E. L. PHILIPP.
Wyoming, JOHN B. KENDRICK.

- '08 ANTIPA, PROF. DR. GREGOIRE, Inspector-General of Fisheries, Bucharest, Roumania.
- '06 BESANA, GIUSEPPE, Lombardy Fisheries Society, Via Rugabello 19, Milan, Italy
- '09 BLUE RIDGE ROD AND GUN CLUB, Harper's Ferry, W. Va.
- '93 BORODINE, NICOLAS, Petrograd, Russia.
- '12 CALDERWOOD, W. L., Inspector of Salmon Fisheries for Scotland, Edinburgh, Scotland.
- '04 DENBIGH, LORD, London, England.
- '89 FISH PROTECTIVE ASSOCIATION OF EASTERN PENNSYLVANIA, 1020 Arch St., Philadelphia, Pa.
- '04 FRYER, SIR CHARLES E., Former Supervising Inspector of Fisheries, Board of Agriculture and Fisheries, London, England.
- '04 HOFER, PROF. DR. BRUNO, Biological Research Station for Fisheries, Munich Germany.
- '04 KISHINOUE, DR. K., Imperial University, Tokyo, Japan.
- '08 KITAHARA, DR. TASAKU, Imperial Fisheries Bureau, Tokyo, Japan.
- '88 LAKE ST. CLAIR SHOOTING AND FISHING CLUB, Detroit, Mich.
- '04 MATSUBARA, PROF. S., Imperial Household Department, Tokyo, Japan.
- '09 NAGEL, HON. CHAS., St. Louis, Mo.
- '95 NEW YORK ASSOCIATION FOR THE PROTECTION OF FISH AND GAME, New York City.
- '08 NORDQVIST, DR. OSCAR FRITJOF, Superintendent of Fisheries, Lund, Sweden.
- '06 PERRIER, PROF. EDMOND, Director Museum of Natural History, Paris France.
- '92 SOUTHSIDE SPORTSMEN'S CLUB, Oakdale, L. I., N. Y.
- '06 STEINDACHNER, PROF. DR. FRANZ, Royal Natural History, Museum, Vienna, Austria.
- '92 VINCIGUERRA, PROF. DR. DECIO, Director Royal Fish Cultural Station, Rome, Italy.
- '06 VON GRIMM, DR. OSCAR, Inspector-General of Fisheries, Petrograd, Russia.
- '08 VON KADICH, DR. HENRICH, Department of Forestry and Domain, Vienna, Austria.
- '06 VON PIKRO, FRANZ, Austrian Fishery Society, Vienna, Austria.

Corresponding Members

- '84 APOSTOLIDES, PROF. NICOLY CHR., Athens, Greece.
'87 ARMISTEAD, J. J., Dumfries, Scotland.
'04 AYSON, CHARLES L., Hakataemen, Oamaru, New Zealand.
'04 AYSON, L. F., Commissioner of Fisheries, Wellington, New Zealand.
'09 FLEGEL, CHAS., Canea, Crete.
'08 HIGGINSON, EDUARDO, Consul for Peru, New York City.
'97 JAFFE, S., Sandfort, Lustringen, Germany.
'84 LANDMARK, A., Inspector of Norwegian Fresh-Water Fisheries, Christiania, Norway.
'84 MARSTON, R. B., Editor of the Fishing Gazette, London, England.
'09 MOHSIN, S. M., Bengal Fisheries Department, Calcutta, India.
'89 OLSEN, DR. O. T., Grimsby, England.
'08 POITEAU, CHARLNEY, Lommel, Belgium.
'84 RAVERET-WATTEL, C., Director of Aquicultural Station at Nid-de-Verdier, 20 Rue des Acacias, Paris.
'09 RIEDEL, C., Bergstedt, Germany.
'84 SÆRS, PROF. G. O., Christiania, Norway.
'84 SOLSKY, BARON N. DE, Director of the Imperial Agricultural Museum, Petrograd, Russia.
'10 STEAD, DAVID G., Fisheries Department, Sydney, New South Wales, Australia.

Patrons

- '14 ALASKA PACKERS' ASSOCIATION, San Francisco, Calif.
- '15 ALLEN, HENRY F. (Agent, Crown Mills), 210 California St., San Francisco, Cal.
- '15 AMERICAN BISCUIT Co., 815 Battery St., San Francisco, Cal.
- '15 AMERICAN CAN Co., Mills Building, San Francisco, Cal.
- '15 ARMOUR & Co., Battery and Union Sts., San Francisco, Cal.
- '15 ARMSBY, J. K., COMPANY, San Francisco, Cal.
- '15 ATLAS GAS ENGINE Co., INC., Foot of 22d Avenue, Oakland, Cal.
- '15 BALFOUR, GUTHRIE & Co., 350 California St., San Francisco, Cal.
- '15 BANK OF CALIFORNIA, N. A., California and Sansome Sts., San Francisco, Cal.
- '15 BLOEDEL-DONOVAN LUMBER MILLS, Bellingham, Wash.
- '15 BOND AND GOODWIN, 454 California St., San Francisco, Cal.
- '15 BURPEE AND LETSON, LTD., South Bellingham, Wash.
- '15 CALIFORNIA BARREL Co., 22d and Illinois Sts., San Francisco, Cal.
- '15 CALIFORNIA DOOR Co., 43 Main St., San Francisco, Cal.
- '15 CALIFORNIA STEVEDORE AND BALLAST Co., INC., 210 California St., San Francisco, Cal.
- '15 CALIFORNIA WIRE CLOTH COMPANY, San Francisco, Cal.
- '15 CASWELL, GEO. W., Co., INC., 530-4 Folsom St., San Francisco, Cal.
- '15 CLINCH, C. G., & Co., INC., 144 Davis St., San Francisco, Cal.
- '15 COFFIN-REDINGTON Co., 35-45 Second St., San Francisco, Cal.
- '15 COLUMBIA RIVER PACKERS' ASSOCIATION, Astoria, Ore.
- '15 CRANE Co. (C. W. Weld, Mgr.), 301 Brannan St., San Francisco, Cal.
- '15 DODGE, SWEENEY & Co., 36-48 Spear St., San Francisco, Cal.
- '15 FIRST NATIONAL BANK OF BELLINGHAM, Bellingham, Wash.
- '15 FULLER, W. P., & Co., 301 Mission St., San Francisco, Cal.
- '15 GRAYS HARBOR COMMERCIAL Co., Foot of 3d St., San Francisco, Cal.
- '15 HENDRY, C. J., Co., 46 Clay St., San Francisco, Cal.
- '15 JONES-THIERBACH Co., THE, Battery and Merchants Sts., San Francisco, Cal.
- '15 KNAPP, THE FRED H., Co., Arcade-Maryland Casualty Building, Baltimore, Md.
- '15 LINEN THREAD Co., THE (W. A. Barbour, Mgr.), 443 Mission St., San Francisco, Cal.
- '15 MATTAGE, CHAS. F., COMPANY, 335 Greenwich St., New York City.
- '15 NAUMAN, C., & Co., 501-3 Sansome St., San Francisco, Cal.
- '15 OLIVER SALT Co., Mt. Eden, Cal.
- '15 MORRISON MILL Co., INC., Bellingham, Wash.
- '15 MORSE HARDWARE Co., INC., 1025 Elk St., Bellingham, Wash.
- '15 PACIFIC HARDWARE AND STEEL Co., 7th and Townsend Sts., San Francisco, Cal.
- '15 PACIFIC STATES ELECTRIC Co., 575 Mission St., San Francisco, Cal.
- '15 PHILLIPS SHEET AND TIN PLATE Co., Weirton, W. Va.
- '15 POPE AND TALBOT, Foot of 3d St., San Francisco, Cal.
- '15 PUGET SOUND NAVIGATION Co., Seattle, Wash.
- '15 RAY, W. S., MFG. Co., INC., 216 Market St., San Francisco, Cal.
- '15 SCHMIDT LITHOGRAPH Co., 2d and Bryant Sts., San Francisco, Cal.
- '15 SCHWABACHER-FREY STATIONERY Co., 609-11 Market St., San Francisco, Cal.
- '15 SHIP OWNERS AND MERCHANTS' TUG BOAT Co., Foot of Green St., San Francisco, Cal.
- '15 SHERWIN-WILLIAMS Co., THE, 454 Second St., San Francisco, Cal.
- '15 SMITH CANNERY MACHINES Co., 2423 South First Avenue, Seattle, Wash.
- '15 STANDARD GAS ENGINE Co., 1 California St., San Francisco, Cal.

- '15 STANDARD OIL Co. OF CALIFORNIA, Standard Oil Building, San Francisco, Cal.
- '15 UNITED ENGINEERING WORKS, 232 Spear St., San Francisco, Cal.
- '15 U. S. RUBBER Co. OF CALIFORNIA (W. D. Rigdon, Mgr.), 50-60 Fremont St., San Francisco, Cal.
- '15 U. S. STEEL PRODUCTS Co., Rialto Building, San Francisco, Cal.
- '15 WELLS FARGO NATIONAL BANK OF SAN FRANCISCO, Montgomery and Market Sts., San Francisco, Cal.
- '15 WESTERN FUEL Co., 430 California St., San Francisco, Cal.
- '15 WESTERN MEAT Co., 6th and Townsend Sts., San Francisco, Cal.
- '15 WHITE BROS., HARDWOOD LUMBER, 5th and Brannan Sts., San Francisco, Cal.

Active Members*

LIFE MEMBERS INDICATED BY ASTERISK (*).

- '16 ADAMS, PROF. CHAS. C., State College of Forestry, Syracuse, N. Y.
 '13 ADAMS, WM. C., Commissioner of Fisheries and Game, Boston, Mass.
 '10 AITCHISON, W. W., 5 Wabash Ave., Chicago, Ill.
 '98 ALEXANDER, GEORGE L., Grayling, Mich.
 '13 ALEXANDER, M. L., President, Louisiana Conservation Commission, New Orleans, La.
 '06 ALFORD, JABE, President State Board of Fish Commissioners, 29 W. Dayton St., Madison, Wis.
 '15 ALLEN, WILLIAM, New Orleans Association of Commerce, New Orleans, La.
 '08 ALLER, H. D., U. S. Bureau of Fisheries, Washington, D. C.
 '08 ANDERSON, AUGUST J., Box 109, Marquette, Mich.
 '13 ANDERSON, CARL A., U. S. Bureau of Fisheries, Manchester, Iowa.
 '12 ANDERSON, FRANK, 1331 East Seventh Ave., Denver, Colo.
 '92 ANDERSON, J. F., Bastad, Sweden.
 '14 ANDERSON, T. T., Liggett and Myers Tobacco Co., St. Louis, Mo.
 '78 ANNIN, JAMES, Caledonia, N. Y.
 '14 ANNIN, HOWARD, Caledonia, N. Y.
 '12 ANTOINE, CHARLES, 340 So. Wabash Ave., Chicago, Ill.
 '15 ARNOLD AND WINSOR CO., 14 Boston Fish Pier, Boston, Mass.
 '10 ASBURY PARK FISHING CLUB, John F. Seger, 703 Cookman Ave., Asbury Park, N. J.
 '84 ATKINS, CHARLES G., U. S. Bureau of Fisheries, East Orland, Me.
 '03 ATWOOD, ANTHONY, 73 Waterest St., Plymouth, Mass.
 '15 ATWOOD, IRVING M., 31 Boston Fish Pier, Boston, Mass.
 '10 AUGUR, W. A., 33 Fulton St., New York City.
- '01 BABCOCK, JOHN P., Provincial Fisheries' Department, Victoria, British Columbia.
 '12 BABCOCK, WILLIAM H., 520 The Rookery, Chicago, Ill.
 '12 BAILEY, HOWARD S., Equitable Building, Denver, Colo.
 '15 BAKER, BOIES AND WATSON CO., 38 Boston Fish Pier, Boston, Mass.
 '15 BALCH, HOWARD K., 158 W. Austin Ave., Chicago, Ill.
 '13 BALDWIN, MARCUS D., Montana Fish and Game Commission, Kalispell, Mont.
 '01 BALDWIN, O. N., U. S. Bureau of Fisheries, Saratoga, Wyo.
 '98 BALL, E. M., U. S. Bureau of Fisheries, Washington, D. C.
 '13 BALL, FRANK H., Grand Lake Stream, Me.
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- '04 PALMER, DR. THEODORE S., United States Department of Agriculture, Washington, D. C.
- '04 PARKHURST, HON. C. FRANK, 54 Barnes St., Providence, R. I.
- '15 PARSONS, JOHN S., State Commissioner of Fisheries, Accomac, Va.
- '07 PATCHING, FRED, Loring, Alaska.
- '13 PATTERSON, A. G., Kentucky Fish and Game Commission, Pineville, Ky.
- '02 PAXTON, THOMAS B., Board of State Fish and Game Commissioners, Cincinnati, Ohio.
- '11 PELL, GEO. W., 520 16th St., Denver, Colo.
- '05 PEOPLES, HIRAM, New Providence, Pa.
- '10 PERCE, H. WHEELER, 1145 Webster Bldg., Chicago, Ill.
- '10 PEW, JOHN J., Gloucester, Mass.
- '09 PFLEUGER, J. E., Akron, Ohio.
- '13 POOLE, GARDNER, 126 Atlantic Ave., Boston, Mass.
- '11 POHOQUALINE FISH ASSOCIATION, 233 Dock St., Philadelphia, Pa.
- '09 POMEROY, GEO. E., Toledo, Ohio.
- '04 POPE, T. E. B., Milwaukee Public Museum, Milwaukee, Wis.
- '06 PORTER, RICHARD, Board of State Fish Commissioners, Paris, Mo.
- '09 POSTAL, FRED., State Board of Fish Commissioners, Detroit, Mich.
- '08 PRINCE, PROF. E. E., Dominion Commissioner of Fisheries, Ottawa, Canada.
- '16 PURDY, DORMAN S., 115 Eddy St., Ithaca, N. Y.
- '03 RACE, E. E., U. S. Bureau of Fisheries, Green Lake, Me.
- '10 RADCLIFFE, LEWIS, U. S. Bureau of Fisheries, Washington, D. C.
- '84 RATHBUN, DR. RICHARD, Assistant Secretary Smithsonian Institution, Washington, D. C.
- '93 RAVENEL, W. DE C., U. S. National Museum, Washington, D. C.
- '13 RAYE, W. H., Sealshipt Oyster Co., Boston, Mass.
- '13 REDWOOD LIBRARY, Newport, R. I.
- '09 REED, DR. H. D., Cornell University, Ithaca, N. Y.
- '13 REIDEL, F. K., Pleasant Mount, Pa.
- '93 REIGHARD, PROF. JACOB E., University of Michigan, Ann Arbor, Mich.
- '13 REYNOLDS, JAS. A., U. S. Bureau of Fisheries, Woods Hole, Mass.
- '16 REYNOLDS, JOHN J., 1610 L. C. Smith Bldg., Seattle, Wash.
- '13 RHINES, WALLACE D., Foreman, State Fish Hatchery, Linlithgo, N. Y.
- '15 RICH, E. A., Co., 4 Boston Fish Pier, Boston, Mass.
- '98 RICHARDS, G. H., Sears Building, Boston, Mass.
- '15 RICHARDSON, ROBERT E., State Biological Laboratory, Havana, Ill.
- '10 RIDER, H. A., State Fish and Game Commissioner, St. Paul, Minn.
- '13 ROACH, EDWIN R., 518 Hamilton Bldg., Akron, Ohio.
- '99 ROBERTS, A. D., Auditor Inland Fisheries Commission, Woonsocket, R. I.
- '10 ROBERTS, B. H., 1413 New York Ave., Washington, D. C.
- '10 ROGERS, JAMES B., U. S. Bureau of Fisheries, Boothbay Harbor, Me.
- '98 RODGERS, J. M., Plaza Hotel, Chicago, Ill.
- '98 ROSENBERG, ALBERT, Kalamazoo, Mich.
- '10 ROWE, HENRY C., Groton, Conn.
- '16 ROWE, WM. H., West Buxton, Me.
- '16 ROYCE, JAMES, DeBruce, Sullivan County, N. Y.

- '11 RUCKMAN, CHAS. W., U. S. Bureau of Fisheries, Homer, Minn.
 '14 RUSSELL, GEO. S., Bank of Commerce of N. A., Cleveland, O.
 '13 RUSSELL, J. R., U. S. Bureau of Fisheries, Birdsview, Wash.
 '13 RYAN, CALVIN D., U. S. Bureau of Fisheries, Concrete, Wash.
- '05 SAFFORD, W. H., Missouri Fish Commission, St. Joseph, Mo.
 '13 SANTA BARBARA PUBLIC LIBRARY, Santa Barbara, Calif.
 '16 SAUNDERS, DR. WADE HAMPTON, Box 296, Roanoke, Va.
 '15 SCHMIDT, CHRIS., Astoria, Wash.
 '15 SCHMIDT, MAX, 2d and Bryant Sts., San Francisco, Cal.
 '15 SCHOFIELD, N. B., Sunnyvale, Cal.
 '15 SCHOONMAKER, BYRON C., De Bruce, N. Y.
 '16 SCHRADER, FRANZ, Route 1, Prince Bay, N. Y.
 '15 SEABORN, H. G., Tee Harbor Packing Co., Port Blakely, Wash.
 '00 SEAGLE, GEORGE A., U. S. Bureau of Fisheries, Wytheville, Va.
 '13 SEAGRAVE, ARNOLD, Woonsocket, R. I.
 '00 SELLERS, M. G., 1518 Sansom St., Philadelphia, Pa.
 '10 SHEBLEY, FRANK A., Superintendent Santa Cruz County Hatchery, Brookdale, Cal.
 '15 SHEBLEY, W. H., Sisson, Cal.
 '13 SHELLFORD, VICTOR E., Dept. Zool., University of Illinois, Urbana, Ill.
- '11 SHIRA, AUSTIN F., U. S. Bureau of Fisheries, Fairport, Iowa.
 '08 SHIRAS, GEO., 3d, Stoneleigh Court, Washington, D. C.
 '15 SIEBE, J. F., 430 Battery, San Francisco, Cal.
 '13 SINGLETON, J. ERNEST, Woonsocket, R. I.
 '01 SINGLETON, JAMES H., Woonsocket, R. I.
 '03 SLADE, GEORGE P., 309 Broadway, P. O. Box 283, New York City.
 '13 SMITH, HERBERT C., White Cloud, Mich.
 '91 SMITH, DR. HUGH M., U. S. Commissioner of Fisheries, Washington, D. C.
- '99 SMITH, LEWIS H., Algona, Iowa.
 '05 SNYDER, J. P., U. S. Bureau of Fisheries, Cape Vincent, N. Y.
 '08 SPEAKS, JOHN C., Chief Warden Fish and Game Commission, Columbus, Ohio.
- '87 SPENSLEY, CALVERT, Mineral Point, Wis.
 '10 STACK, F. GEORGE, "Kamp Kill Kare," Raquette Lake, N. Y.
 '13 STAPLETON, J. J., Green Lake, Me.
 '04 STAPLETON, M. F., U. S. Bureau of Fisheries, Manchester, Iowa.
 '15 STARR, C. D., Lewis Bldg., Portland, Ore.
 '00 STARR, W. J., State Board of Fish Commissioners, Eau Claire, Wis.
 '03 STEELE, G. F., Room 604, 18 E. 41st St., New York City.
 '11 STERETT, W. G., State Game, Fish and Oyster Commission, Port Lavaca, Texas.
- '03 STEVENS, ARTHUR F., 227 West Grand St., Elizabeth, N. J.
 '12 STIVERS, D. GAY, Butte Anglers' Association, Butte, Mont.
 '14 STONE, DR. WILLARD J., 3 Harold Arms, Toledo, Ohio.
 '04 STORY, JOHN A., U. S. Bureau of Fisheries, Green Lake, Me.
 '15 STRINGHAM, EMERSON, U. S. Bureau of Fisheries, Hamilton, Ill.
 '14 STRUVEN, CHAS. M., 114 S. Frederick St., Baltimore, Md.
 '14 STRYKER, THOS. H., Rome, N. Y.
 '13 SULLIVAN, WALTER E., Tuft's School of Medicine, Boston, Mass.
 '04 SUBBUR, THADDEUS, U. S. Bureau of Fisheries, Homer, Minn.
 '15 SUTRO, ADOLPH NEWTON, 1155 Pine St., San Francisco, Cal.
 '10 SWORD, C. B., New Westminster, British Columbia, Canada.
- '04 TALBOT, HENRY, Interstate Commerce Commission, Washington, D. C.

- '13 THAW, AUGUST B., 1421 Shelby St., Indianapolis, Ind.
- '99 THAYER, W. W., U. S. Bureau of Fisheries, Northville, Mich.
- '06 THOMAS, W. H., U. S. Bureau of Fisheries, Fairport, Iowa.
- '13 THOMAS, ADRIAN, 2019 Hanover Ave., Richmond, Va.
- '00 THOMPSON, W. P., 123 N. Fifth St., Philadelphia, Pa.
- '00 THOMPSON, W. T., U. S. Bureau of Fisheries, Bozeman, Mont.
- '08 THOMSON, G. H., Estes Park, Colo.
- '15 THORNE, ANDREW, 745 Mills Bldg., San Francisco, Cal.
- '13 TICHENOR, A. K., Secretary Alaska Packers' Assn., San Francisco, Calif.
- '14 TILLMAN, ROBERT T., Beacon Paper Co., St. Louis, Mo.
- '13 TIMSON, WM., Vice-President, Alaska Packers' Assn., San Francisco, Calif.
- '92 TITCOMB, JOHN W., Commissioner of Fisheries and Game, Lyndonville, Vt.
- '11 TONGUE, LEONARD M., 718 Equitable Bldg., Baltimore, Md.
- '14 TORREY, PROF. HARRY BEAL, Reed College, Portland, Ore.
- '01 and '12 TOWNSEND, DR. CHARLES H., Director New York Aquarium, New York, N. Y.
- '13 TREXLER, COL. HARRY C., Allentown, Pa.
- '13 TRIGGS, CHAS. W., 218 N. Canal St., Chicago, Ill.
- '15 TROYER, M., Astoria Iron Works, Seattle, Wash.
- '16 TRULL, HARRY S., 317 E. 196th St., Fordham, N. Y.
- '99 TURBS, FRANK A., U. S. Bureau of Fisheries, Mammoth Spring, Ark.
- '98 TULLIAN, EUGENE A., Box 1267, New Orleans, La.
- '14 TURNER, CHAS. C., Judge Kentucky Court of Appeals, Frankfort, Ky.
- '13 TYSON, JAS. W., Connecticut Fish and Game Commission, Hartford, Conn.
- '11 VALLETTE, LUCIANO H., Chief of Section of Fish Culture, 827 Rivadavia, Buenos Aires, Argentina.
- '09 VAN ATTA, CLYDE H., U. S. Bureau of Fisheries, Leadville, Colo.
- '14 VANDERGRIFF, S. H., 1728 New Hampshire Ave., Washington, D. C.
- '10 VAN SICKLEN, F. W., 36 Spear St., San Francisco, Cal.
- '13 VARDEN, GEO. S., Paris, Ky.
- '10 VILES, BLAINE S., Inland Fish and Game Commissioner, Augusta, Me.
- '14 VOGEL, J. C., 2203 Pearl St., Philadelphia, Pa.
- '00 VOGELSIANG, ALEXANDER T., 20 Montgomery St., San Francisco, Cal.
- '12 VOOT, JAMES H., Nevada Fish Commission, Carson City, Nev.
- '09 VON LENGINEKE, J., 200 Fifth Ave., New York City.
- '06 WADDELL, JOHN, Grand Rapids, Mich.
- '15 WAKEFIELD, L. E., 1310 Smith Bldg., Seattle, Wash.
- '96 WALKER, BRYANT, Detroit, Mich.
- '11 WALKER, DR. H. T., 210 Main St., Denison, Texas.
- '96 WALTERS, C. H., Cold Spring Harbor, N. Y.
- '98 WARD, PROF. H. B., University of Illinois, Urbana, Ill.
- '12 WARD, J. QUINCY, Executive Agent, Kentucky Game and Fish Commission, Frankfort, Ky.
- '14 WASHBURN, PROF. F. L., 1112 Sixth St., S. E., Minneapolis, Minn.
- '13 WATTS, A. E., 9 T Wharf, Boston, Mass.
- '92 WEBB, W. SEWARD, 44th St. and Vanderbilt Ave., New York City.
- '16 WEEKS, ANDREW GRAY, 8 Congress St., Boston, Mass.
- '13 WEIL, WALTER G., Majestic Bldg., Chicago, Ill.
- '15 WEIS, CAPT. JAS. E., St. Joseph, Mo.

- '15 WEISE, ENGLERBERG, Seattle, Wash.
 '13 WELSH, WM. W., Scientific Assistant U. S. Bureau of Fisheries, Washington, D. C.
 '15 WELSH, R., Bellingham, Wash.
 '15 WENNERBERG, HENRY P., 23 Boston Fish Pier, Boston, Mass.
 '01 WENTWORTH, E. E., U. S. Bureau of Fisheries, Duckabush, Wash.
 '13 WESTERFELD, CARL, 854 Mills Bldg., San Francisco, Cal.
 '13 WESTERMANN, J. H., Harrietta, Mich.
 '01 WHEELER, CHARLES STETSON, Union Trust Building, San Francisco, Cal.
 '15 WHEELER, FRED. M., 546 Fulton St., Chicago, Ill.
 '04 WHITAKER, ANDREW R., State Fishery Commission, Phoenixville, Pa.
 '96 WHITE, R. TYSON, 390 Bridge Street, Brooklyn, N. Y.
 '10 WHITMAN, EDWARD C., Canso, Nova Scotia, Canada.
 '15 WHITMAN, WARD AND LEE CO., 9 Boston Fish Pier, Boston, Mass.
 '15 WHITESIDE, R. B., 204 Sellwood Bldg., Duluth, Minn.
 '99 WILLARD, CHARLES W., President Inland Fisheries Commission, Westerly, R. I.
 '01 WILSON, C. H., Glen Falls, N. Y.
 '11 WILSON, J. S. P. H., Chairman, Board of Inland Game and Fish Commissioners, Auburn, Me.
 '10 WINCHESTER, GRANT E., Forest, Fish and Game Commission, Bemus Point, N. Y.
 '00 WINN, DENNIS, U. S. Bureau of Fisheries, 1217 L. C. Smith Bldg., Seattle, Wash.
 '13 WINTER, J. H., Alaska Packers' Assn., San Francisco, Calif.
 '99 WIRES, S. P., U. S. Bureau of Fisheries, Duluth, Minn.
 *'13 WISNER, J. NELSON, Director, Institute de Pesca del Uruguay, Punta del Este, Uruguay.
 *'05 WOLTERS, CHAS. A., Oxford and Marvine Streets, Philadelphia, Pa.
 '97 WOOD, C. C., Plymouth, Mass.
 '13 WOODS, JOHN P., President, Missouri State Fish Commission, 1st and Wright Sts., St. Louis, Mo.
 '14 WORK, GERALD, Perkins Hill, Akron, Ohio.
 '84 WORTH, S. G., U. S. Bureau of Fisheries, 616 West 38th St., Norfolk, Va.
 '15 WYMAN, WILLIS L., Park Rapids, Minn.
 '09 YERINGTON, EDWARD B., Board of Fish Commissioners, Carson City, Nev.
 '99 ZALSMAN, P. G., Grayling, Mich.

RECAPITULATION

HONORARY	73
CORRESPONDING	17
PATRONS	54
ACTIVE	547
TOTAL	691

CONSTITUTION

(As amended to date)

ARTICLE I

NAME AND OBJECT

The name of this Society shall be American Fisheries Society. Its object shall be to promote the cause of fish culture; to gather and diffuse information bearing upon its practical success, and upon all matters relating to the fisheries; the uniting and encouraging of all interests of fish culture and the fisheries, and the treatment of all questions regarding fish, of a scientific and economic character.

ARTICLE II

MEMBERSHIP

Active Members.—Any person may, upon a two-thirds vote and the payment of two dollars, become a member of this Society. In case members do not pay their fees, which shall be two dollars per year after first year, and are delinquent for two years, they shall be notified by the treasurer, and if the amount due is not paid within a month thereafter, they shall be, without further notice, dropped from the roll of membership.

Any library, sporting or fishing club, society, firm or corporation may, upon two-thirds vote and the payment of the regular annual fee, become a member of this Society and entitled to all its publications.

Life Members.—Any person shall, upon a two-thirds vote and the payment of twenty-five dollars, become a life member of this Society, and shall thereafter be exempt from all annual dues.

Patrons.—Any person, society, club, firm or corporation, on approval by the Executive Committee and on payment of \$50.00, may become a Patron of this Society

with all the privileges of a life member, and then shall be listed as such in all published lists of the Society. The money thus received shall become a part of the permanent funds of the Society and the interest alone be used as the Society shall designate.

Honorary and Corresponding Members.—Any person can be made an honorary or a corresponding member upon a two-thirds vote of the members present at any regular meeting.

The President (by name) of the United States and the Governors (by name) of the several states shall be honorary members of the Society.

Election of Members Between Annual Meetings.—The President, Recording Secretary and Treasurer of the Society are hereby authorized, during the time intervening between annual meetings, to act on all individual applications for membership in the Society, a majority vote of the Committee to elect or reject such applications as may be duly made.

ARTICLE III

SECTIONS

On presentation of a formal written petition signed by one hundred or more members, the Executive Committee of the American Fisheries Society may approve the formation in any region of a Section of the American Fisheries Society to be known as the — Section.

Such a Section may organize by electing its own officers, and by adopting such rules as are not in conflict with the Constitution and By-Laws of the American Fisheries Society.

It may hold meetings and otherwise advance the general interests of the Society, except that the time and place of its annual meeting must receive the approval of the Executive Committee of the American Fisheries Society, and that without specific vote of the American Fisheries Society, the Section shall not commit itself to

any expression of public policy on fishing matters.

It may further incur indebtedness to an amount necessary for the conduct of its work not to exceed one-half of the sum received in annual dues from members of said section.

Such bills duly approved by the Chairman and Recorder of the Section shall be paid on presentation to the Treasurer of the American Fisheries Society.

ARTICLE IV

OFFICERS

The officers of this Society shall be a president and a vice-president, who shall be ineligible for election to the same office until a year after the expiration of their term; a corresponding secretary, a recording secretary, an assistant recording secretary, a treasurer, and an executive committee of seven, which, with the officers before named, shall form a council and transact such business as may be necessary when the Society is not in session—four to constitute a quorum.

In addition to the officers above named there shall be elected annually five vice-presidents who shall be in charge of the following five divisions or sections:

1. Fish culture.
2. Commercial fishing.
3. Aquatic biology and physics.
4. Angling.
5. Protection and legislation.

Vice-Presidents of sections are expected to present reports at each annual meeting.

ARTICLE V

MEETINGS

The regular meeting of the Society shall be held once a year, the time and place being decided upon at the pre-

vious meeting, or, in default of such action, by the executive committee.

ARTICLE VI

ORDER OF BUSINESS

1. Call to order by president.
2. Roll call of members.
3. Applications for membership.
4. Reports of officers.
 - a. President.
 - b. Secretary.
 - c. Treasurer.
 - d. Vice-Presidents of Divisions.
 - e. Standing Committees.
5. Committees appointed by the president.
 - a. Committee of five on nomination of officers for ensuing year.
 - b. Committee of three on time and place of next meeting.
 - c. Auditing committee of three.
 - d. Committee of three on programme.
 - e. Committee of three on publication.
 - f. Committee of three on publicity.
6. Reading of papers and discussion of same.

(Note—In the reading of papers preference shall be given to the members present.)
7. Miscellaneous business.
8. Adjournment.

ARTICLE VII

CHANGING THE CONSTITUTION

The constitution of the Society may be amended, altered or repealed by a two-thirds vote of the members present at any regular meeting, provided at least fifteen members are present at said regular meeting.





